REMARKS

Claims 1-20 are pending in the present application. Claims 1-8 and 10-20 are rejected. Claims 2-10 are herein canceled without prejudice or disclaimer. Claim 1 has been amended herein, limitations from claim 4, 8 and 9 having been imported thereto. Attached hereto is a marked-up version of the changes made by the current amendment, captioned "Version with markings to show changes made."

Rejections under 35 U.S.C. §102(b)

Claims 1-6, 8 and 10-20 are rejected under 35 U.S.C. §102(b) as being anticipated by JP 8283557 to Masao et al.

The Examiner asserts that Masao et al. discloses the claimed compositions and sheets and fibers thereof.

Applicants respectfully disagree with the rejection. JP 8-283557 (JP '557) discloses a plasticized polylactic acid composition prepared by mixing a polymer plasticizer formed mainly from an aliphatic dicarboxylic acid and a linear diol (it is described that sub-components may be included and examples of sub-components comprises hydroxy alkylcarboxylic acid such as lactic acid in [0019] in column 4 in the Japanese specification) at a weight ratio of 99/1 to 50/50.

The linear diol used in the plasticizer is merely described in [0018] in column 4 in the Japanese specification, however, "dimer diol having 20 to 45 carbon atoms" which is described in the above amended claim 1 is not disclosed in JP '557.

Therefore, the present invention clearly differs from the invention of JP '557 about resin components.

Furthermore, claims 11-20 disclose a polyester composition comprising a lactic acid polyester (III) containing an agent imparting impact resistance (IV) has a lactic acid unit (I) and a polyester unit (II) at a weight ratio within the range of 10:90 to 90:10.

On the other hand, JP '557 discloses a resin, which corresponds to lactic acid polyester (III) of the present invention, comprising aliphatic dicarboxylic acid and linear diol, and other components such as a lactic acid as described in [0019]. However, an amount of components other than the aliphatic dicarboxylic acid and the linear diol is not described therein.

In the claims of the present application, according to the adoption of lactic acid polyester (III) comprising lactic acid unit (I) and polyester unit (II) at a weight ratio within a specific range, superior properties are provided such that bleedout of the lactic acid polyester is not generated in a film formed of the polyester composition. As shown in test results of the attachment, the sample using a lactic acid polyester containing 10% by weight of lactic acid unit (Example No. 3; corresponding to the present claims) has remarkably superior resistance to bleedout to the sample using a lactic acid polyester containing 5% by weight of lactic acid unit (Example No. 2).

Therefore, Applicants submit that it is clear that the claim of the present application differs from the invention of JP '557.

Claims 1-7 and 10-20 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,616,657 to Imamura et al.

The Examiner asserts that the examples Tg and Mw of Imamura et al. anticipate the instantly claimed polyester and compositions thereof. The Examiner asserts that since the polyesters of Imamura et al. otherwise meet the limitations of the instant claims, they inherently possess the other properties of the instant claims. The same polymer meets both polyesters in the instantly claimed polyester blends also since no limitations differentiating the two polyesters are seen. The Examiner concludes that it would have been obvious that the dimer acids of Imamura et al., column 6, lines 66-67, would have the instantly claimed number of carbons.

Applicants respectfully disagree with the above rejection. U.S. Patent 5,616,657 (U.S. '657) discloses a process for the preparation of a high molecular lactic copolymer polyester, which comprises allowing a lactide (A), a polyester terminated by hydroxyl group at both ends (B1), a polyvalent carboxylic acid having 3 or more functionalities and/or acid anhydride thereof (C) to undergo ring opening copolymerization in such an amount that the weight ration of (A)/(B1) is from 50/50 to 98/2 and the proportion of the component (C) is from 0.001 to 5% by weight of the sum of the amount of the components (A) and (B1) in the presence of a ring opening polymerization catalyst (D); and a formed or molded product of a high molecular lactic copolymer polyester prepared by the preparation process.

However, Applicants note that U.S. '657 does not disclose a lactic acid polyester obtained by a lactide and polyester terminated by hydroxyl group at both ends without using tri- or

polycarboxylic acids, as described in the amended claim 1, and a composition obtained by mixing the lactic acid polyester and the polyhydroxy carboxylic acid, as described in the claims of the present application.

Therefore, Applicants submit that the present invention can not be obvious in light of the invention of U.S. '657.

Claims 1-8 and 10-20 are rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,844,066 to Kakizawa.

The Examiner asserts that Kakizawa discloses the instantly claimed polyester. The comonomers are added to obtain a softer, i.e. lower Tg, polyester. The Examiner asserts that lowering the Tg of polylactide necessarily gives the instantly claimed Tg. Since only ester moieties are required by the instant claims, the polymer of the patentee can be divided into ester segments according to the instantly claimed amounts and still have ester moieties in both portions of a given molecule sample that meets the instantly claimed amounts. The Examiner asserts that since the claimed polyesters otherwise meet the limitations of the instant claims, they are expected to necessarily inherently possess the other properties of the instant claims. The Examiner concludes that it would have been understood by the ordinary skilled artisan that the dimer acids of the patentee would have the instantly claimed number of carbons.

Applicants respectfully disagree with the above rejection. U.S. Patent 5,844,066 (U.S. '066) discloses a process for the preparation of a lactic acid-based polyester, which comprises melt-

kneading a lactic acid-based polyester with an organic chelating agent and removing the volatile component by devolatilization under reduced pressure, wherein said lactic acid-based polyester comprises a lactic acid component and a polyester consisting of a dicarboxylic acid component and a diol component; and a process of adding an organic chelating agent to the lactic acid-based polyester, and then molding the mixture of said lactic acid-based polyester and said organic chelating agent.

However, U.S. '066 does not disclose a lactic acid polyester obtained by a lactide and polyester terminated by hydroxyl group at both ends, as described in the amended claim 1, and a composition obtained by mixing the lactic acid polyester and the polyhydroxy carboxylic acid at a weight ratio within a specific range, as described in the claims of the present application.

Therefore, the present invention differs from the invention of U.S. '066, and is not obvious in light thereof.

Claims 1-8 and 10-20 are rejected under 35 U.S.C. §102(b) as being anticipated by Patent No. 5,525,671 to Ebato et al.

Applicants respectfully disagree with the rejection. U.S. Patent 5,525,671 (U.S. '671) discloses a process for continuously producing a linear lactide copolymer using a continuous reaction apparatus composed of three or more stirred flow reactors connected in series, which process comprises the steps of: continuously feeding of a lactide and a polymer having a hydroxyl group in a melted state or a dissolved in a solvent to the first reactor of said continuous reaction apparatus;

and transferring the reaction mixture from said first reactor to the following reactors successively while maintaining the reaction pressure and the reaction temperature in every reactor in the range of from 1 to 5 atoms, and of from 140° to 210°C, respectively, to conduct ring opening copolymerization and, after the reaction, a residual lactide and/or a residual solvent in the copolymer obtained is/are reduced to 1% by weight or less.

However, Applicants note that U.S. '670 does not disclose a lactic acid polyester obtained by a lactide and polyester terminated by hydroxyl group at both ends, as described in the amended claim 1, and a composition obtained by mixing the lactic acid polyester and the polyhydroxy carboxylic acid at a weight ratio within a specific range, as described in the claims of the present invention.

Therefore, Applicants submit that the present invention significantly differs from the invention of U.S. '671, and is not rendered obvious in light thereof.

Claims 1-8 and 10-20 are rejected under 35 U.S.C. §103(a) as being unpatentable over each of Imamura et al., Kakizawa, and Ebato et al. in view of U.S. Patent No. 6,114,495 to Kolstad et al.

The Examiner asserts that Imamura et al., Kakizawa and Ebato et al. each disclose the above discussed compositions, the fact that lowering Tg is desired, and that plasticizers, including polyester plasticizers may be used. The Examiner concludes that it would have been obvious to one of ordinary skill in the art at the time of the instant invention to add the instantly claimed polyester to the claimed polymer composition in order to lower Tg and thereby improve impact resistance.

Applicants respectfully disagree with the above rejection. U.S. Patent 6,114,495 (U.S. '495) discloses a polymer composition comprising polylactide polymer and catalyst deactivating agent which comprises an acrylic acid polymer.

However, U.S. '495 does not disclose a lactic acid polyester obtained by a lactide and polyester terminated by hydroxyl group at both ends, as described in amended claim 1, and a composition obtained by mixing the lactic acid polyester and the polyhydroxy carboxylic acid at a weight ratio within a specific range, as described in the claims of the present invention.

Therefore, the present invention differs from the invention of U.S. '495.

The present invention provides a lactic acid polyester (agent imparting impact resistance) imparting impact resistance, which increases resistance to the bleedout and imparts superior flexibility, transparency, and impact resistance by adding to polyhydroxy carboxylic acids, and in particular, provides an agent imparting impact resistance which is useful for polyhydroxy carboxylic acids. Furthermore, the present invention provides a polyester composition, a molded article composed of the polyester composition, and a film composed of the polyester composition, each having resistance to bleedout, superior flexibility, transparency, and impact resistance. These elements are not disclosed or suggested in the above five citations.

As described above, even if the above citations are combined, the present invention and effects thereof cannot be anticipated. Therefore, the present invention would not have been obvious to one having ordinary skill in the art at he time the invention was made.

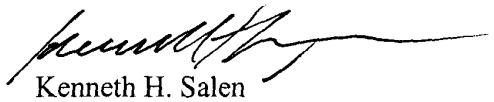
For at least the above reasons, Applicants respectfully submit that the claimed invention, as herein amended, is in condition for allowance.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees that may be due with respect to this paper to Deposit Account No. 01-2340.

Respectfully submitted,

ARMSTRONG, WESTERMAN & HATTORI, LLP



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PATENT TRADEMARK OFFICE

Enclosures: Version with markings to show changes made
Experiments to Compare the Present Invention and JP 8-283557

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VERSION WITH MARKINGS TO SHOW CHANGES MADE
Serial No. 09/926,576

IN THE CLAIMS:

Please amend claim 1 as follows:

1. (Amended) An agent imparting impact resistance for polyhydroxy carboxylic acids comprising a lactic acid polyester (III) having a lactic acid unit (I) and polyester unit (II), comprised of a dicarboxylic acid (A) and a diol (B), at a weight ratio within a range of 10:90 to 90:10, a weight average molecular weight of 10,000 or more, and a glass transition temperature of 60°C or below, and wherein the diol (B) includes a dimer diol having 20 to 45 carbon atoms.

Experiments to Compare the Present Invention and JP 8-283557
Serial No. 09/926,576

EXPERIMENTS TO COMPARE THE PRESENT INVENTION AND JP 8-283557

OBJECTIVE

The objective of these experiments is to determine differences between the present invention and the invention of JP 8-283557.

An agent imparting impact resistance having 5% by weight of a lactic acid component was prepared. A polymer blend using the agent imparting impact resistance having 5% by weight of a lactic acid component was prepared and was evaluated to compare with the polymer blend using the agent imparting impact resistance (C-8) (10% by weight of the lactic acid component) prepared in Production Example 8 of the present invention. The results show that 10% by weight or more of the lactic acid component is essential in the polyester composition.

EXPERIMENTS

TEST 1

Synthesis of Agent Imparting Impact Resistance (using 5% by weight of lactic acid component based on Reference Example 5 and Production Example 8)

95 parts by weight of polyester (A-5) prepared in Reference Example 5 of the present invention, 4.8 parts by weight of L-lactide, 0.2 parts by weight of D-lactide, and 15 parts by weight of toluene relative to the total amount of lactide and polyester were placed in a separatory flask and melted at 175°C. After the material melted and the liquid became uniform, 500 ppm of titanium tetraisopropoxide were added followed by stirring for 6 hours at 173°C. Following completion of polymerization, 500 ppm of ethylhexanoic phosphate were added to obtain lactic acid polyester having a number average molecular weight (Mn) as determined by polystyrene conversion using GPC of 37,000, and a weight average molecular weight (Mw) of 83,000 (to be referred to as Agent Imparting Impact Resistance C-8'). See Table 1.

TEST 2

Production of Polymer Blend of C-8' and PLA

80 parts by weight of PLA and 20 parts by weight of agent imparting impact resistance (C-8') prepared in Test 1 were melted and kneaded while heating at 190°C using

a twin screw extruder (manufactured by Toyo Seiki) to obtain polymer blend (C-8') followed by forming into pellets. This pellets were evaluated according to the measuring method of the present invention. The results are shown in Table 2.

TEST 3

Production of Polymer Blend of C-8 and PLA

80 parts by weight of PLA and 20 parts by weight of agent imparting impact resistance (C-8) prepared in Production Example 8 of the present invention were melted and kneaded while heating at 190°C using a twin screw extruder (manufactured by Toyo Seiki) to obtain polymer blend (C-8") followed by forming into pellets. This pellets were evaluated according to the measuring method of the present invention. The results are shown in Table 2.

Table 1

		Test 1	Production Example 8
Polyester	Polyester used	A-5	A-5
	Charged amount (weight)	95	90
Lactide	L/D	96/4	96/4
	Charged amount (weight)	5	10
Agent imparting impact resistance	Polymer name	C-8'	C-8
	Mw (×10,000)	8.3	9.1
	Mn (×10,000)	3.7	3.8

Table 2

		Test 2	Test 3
Polymer	Polyester used	PLA	PLA
	Molecular amount (Mw/Mn) (×10,000)	25/16	25/16
Agent imparting impact resistance	Charged amount (parts by weight)	80	80
	Polymer name	C-8'	C-8
	Charged amount (parts by weight)	20	20
Polymer blend	Blend name	P-8'	P-8"
	Tg (°C)	43	50
	mp (°C)	150	158
	Storage modulus of elasticity (GPa) at 20°C	2.4	2.4
	Izod impact strength (kJ/m^2)	14.1	14.5
200 μm film	**Haze (%)**	**31**	**20**
	DuPont impact strength (J)	0.47	0.52
	Number of days until start of bleedout	**200 days**	**1 year or more**

RESULTS

When the amount of lactide is 10% by weight in the agent imparting impact resistance (the present invention), compatibility of polylactic acid and the agent imparting impact resistance is improved. As a result, the size of an island phase of the agent imparting impact resistance to a sea phase of polylactic acid in the agent imparting impact resistance containing 10% by weight of lactide content becomes smaller than that in the agent imparting impact resistance containing 5% by weight of lactide content, so that the haze is decreased and resistance to bleedout is improved.